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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

APPELLANTS: K. Matsuyama et al.

GROUP: 2854

U.S. SERIAL NO.: 10/630,470

EXAMINER: A. Nguyen

FILED: July 29, 2003

FOR: IMAGE FORMING APPARATUS

CERTIFICATE OF EXPRESS MAILING

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BRIEF ON APPEAL

Sir:

This is an appeal from the final rejection of claims 1-10, as included in the Final Office Action mailed by the U.S. Patent and Trademark Office on January 10, 2006.

BRIEF ON APPEAL FEE

Authorization to charge Deposit Account No. 04-1105 for \$620.00 is provided herewith, including the appeal brief fee of \$500, plus a one-month extension fee of \$120. However, if for any reason a fee is required, a fee paid is inadequate or credit is owed for any excess fee paid, the Commissioner is hereby authorized and requested to charge Deposit Account No. **04-1105**.

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REAL PARTY IN INTEREST

The real party in interest is Sharp Kabushiki Kaisha. The assignment of the inventors to this corporation was recorded on July 29, 2003 at Reel 014348, Frame 0683.

RELATED APPEALS AND INTERFERENCES

There are no related appeals or interferences known to Appellants, Appellants' legal representative, or the assignee which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

STATUS OF CLAIMS

Claims 1-10 stand finally rejected. Claims 1-10 are appealed.

STATUS OF AMENDMENTS

An Amendment (after final rejection) was filed on June 28, 2006. This Amendment was not entered, according to an Advisory Action mailed by the U.S. Patent and Trademark Office on July 27, 2006.

A clean set of the claims on appeal is set forth in the Claims Appendix hereto.

SUMMARY OF CLAIMED SUBJECT MATTER

Independent claims 1 and 10 are pending in the application.

Independent claim 1 recites an image forming apparatus, for example, the image forming apparatus 100 depicted in FIG. 1 of the application (see specification at page 12, lines 2-6). The image forming apparatus includes at least a sheet eject mechanism, for example, a separator 1 (see specification at page 18, lines 11-14), and a control device, such as the control device 150 (see FIG. 5; and specification at page 22, last paragraph to page 23, first paragraph).

As recited in independent claim 1, the sheet eject mechanism is "movable between an initial position and a sorting position in a direction orthogonal to a sheet transport direction in sorting processing," and sorted sheets are ejected to a receiving tray.

Referring to FIGS. 6A to 6C of the application, the separator 1 can move between an initial position P_c and sorting positions P_f and P_r (see specification at page 24, lines 7-16). In particular, during sorting processing, the separator moves back and forth between the initial position P_c and the front-side sorting position P_f , and between the initial position P_c and the rear-side sorting position P_r , "so as to sort and eject the recording sheets" to front-side and rear-side eject positions (see specification at page 25, lines 9-15). The separator 1 is moved in a direction orthogonal to a sheet transport direction (see, e.g., specification at page 25, lines 19-21). The sheets are ejected onto a sheet eject tray 170b (see FIG. 7; specification at page 25, lines 9-10).

Independent claim 1 also recites "a control device for determining a delay time required for the sheet eject mechanism moving from the initial position to the sorting position with a sheet held therein to start to return to the initial position after ejecting the sheet to the receiving tray," where the delay time is calculated "based on a difference in length between a transport interval that varies according to sizes of sheets being processed and time that it takes the sheet eject mechanism to move back from the sorting position to the initial position, the sheets being transported sequentially to the sheet eject mechanism at the transport interval."

As described in the specification, for example, on page 29, last line to page 30, line 10, "delay time" is the amount of time before a recording sheet is stably positioned at the front-side or rear-side eject positions so that the separator 1 can move back to the initial position P_c after the rear end of a sheet to be ejected passes an ejection sensor and falls away from the separator 1.

As recited in independent claim 1, the sheet eject mechanism moves from the initial position to the sorting position with a sheet held therein. After the sheet eject mechanism reaches the sorting position, the sheet is ejected, and the sheet eject mechanism starts to return to the initial position (see, e.g., specification at page 29, last line to page 30, line 10). In other words, after the sheet is ejected, the sheet eject mechanism moves back to the initial position without holding any sheet.

As further recited in independent claim 1, "delay time" is set based on a difference between a transport interval that varies according to sizes of sheets being processed and time that it takes the sheet eject mechanism to move from the sorting position to the initial position. The

"transport interval" is described on page 31, last paragraph of the specification, and refers to the time between the passage of a rear end of a "former recording sheet" and the front end of a "latter recording sheet." As described in the specification, "the sheet transport interval needs to be longer than the sum of the time it takes the separator 1 to move back and the delay time T2" (see page 33, lines 16-18). The sheet transport interval depends on image-forming speed and the sheet size (see specification at page 33, lines 18-20). Independent claim 1 specifically requires the transport interval to vary "according to sizes of sheets being processed."

Calculation of the delay time is summarized on page 38, lines 6-14 of the specification: "the delay time T2 is appropriately adjusted according to a transport interval corresponding to recording sheet size, thereby assuring that a recording sheet is prevented from being transported to the separator 1 before the separator 1, after ejecting the preceding recording sheet, returns to the initial position P_c and thus sorting processing on the sheet eject tray 170b is performed without recording sheet jam."

In operation, the sheet eject mechanism should return to the initial position as soon as possible after ejecting a first sheet (former recording sheet) in the sorting position, in order to catch hold of a second sheet (latter recording sheet). However, if the sheet eject mechanism starts to return to the initial position immediately after ejecting the first sheet, the sheet eject mechanism may come into contact with the first sheet during its fall onto the receiving tray, thereby causing a sheet stacking problem. This problem is avoided by waiting the claimed "delay time" (see also specification at page 31, last paragraph to page 32, first paragraph).

Independent claim 10 recites an image forming apparatus, including a sheet eject mechanism and a control device, similar to independent claim 1. However, in independent claim 10, the control device regulates delay time "based on detected sizes of sheets being processed." As described in the specification, the delay time T2 is "limited by an interval between recording sheets transported in succession which varies according to sheet size and image-forming speed" (see page 31, last paragraph). An example of the relationship between sheet size, image-forming speed, and sheet transport interval, all of which relate to delay time, is provided in FIG. 12, and described on pages 32-34 of the specification.

GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

The only ground of rejection to be reviewed on appeal is:

Whether claims 1-10 are unpatentable under 35 USC §103(a) over U.S. Patent 6,113,094 to Horiguchi et al. (hereinafter "Horiguchi") in view of U.S. Patent No. 6,445,891 to Shiraishi (hereinafter "Shiraishi").

ARGUMENT

The arguments contained herein pertain to the only ground of rejection, i.e., claims 1-10 are not obvious over the proposed combination of Horiguchi in view of Shiraishi. The following subheadings I to III address shortcomings in this ground of rejection. In summary, claims 1-10 are patentable over the proposed combination, and the final rejection should be vacated.

- I. **There is no teaching or suggestion in Horiguchi in view of Shiraishi of an image forming apparatus in which delay time for a sheet eject mechanism to start to return to an initial position from a sorting position is determined "based on a difference in length between a transport interval that varies according to sizes of sheets being processed and time that it takes the sheet eject mechanism to move back from the sorting position to the initial position," or where the delay time is regulated "based on detected sizes of sheets being processed."**

In the Final Office Action of 01/10/2006, it was admitted: "Horiguchi et al. does not teach the sheet eject mechanism which moves between an initial position and a sorting position and the control device [for] regulating a delay time required for the sheet mechanism moving from the initial position to the sorting position or other position" (Final Office Action at page 2, last paragraph).

The Shiraishi reference was cited allegedly for teaching "a control device (CPU) 31 which regulates a delay time for the sheet eject mechanism which moves from a position to other

position via the initial sensor 26, the timing sensors 25, 38 and an offset motor 37" (Final Office Action at page 2, last paragraph).

Shiraishi is directed to an image forming apparatus fitted with an offset stacker, which includes an error detection means for detecting an error in offset stacking and forced stopping means responsive to the error detection means for forcing a paper transport mechanism and an image forming means to stop their operation when an error is detected by the error detection means (see column 1, line 64 to column 2, line 9 of Shiraishi). In Shiraishi, copy processing is "stopped immediately on the occurrence of a displacement in the timing of the offset motor signal or a malfunction of the moving element 22" (see column 8, lines 32-38).

FIG. 4 of Shiraishi is a timing diagram illustrating operation of the offset stacker 2, e.g., for offset stacking of alternate copies (see column 5, lines 19-21). A timing sensor 25 is turned ON when a copy is transported from the digital copying machine 1 to the offset stacker 2 (see column 5, lines 22-24). In Shiraishi, the CPU 31 issues an OFFSET command to a motor driver 37 at time T3, which occurs "[a]fter a lapse of a predetermined time from the time T2" (when the timing sensor 25 is turned OFF). Thereafter, "a predetermined time elapses" and the moving element 22 is moved to the opposite position by a predetermined offset.

In Shiraishi, according to the above operation, a copy sheet is discharged into the discharge tray 3 offset to the left (see column 6, lines 3-5). A further operation can be carried out to discharge a subsequent copy sheet to the right (see column 6, lines 28-30). In other words, offset stacking in Shiraishi is carried out according to predetermined times for moving the moving element 22. There is no teaching or suggestion of a delay time that varies according to sizes of sheets being processed or based on detected sheet size.

Shiraishi simply does not teach or suggest a control device for determining delay time for a sheet eject mechanism to return to an initial position from a sorting position based on a difference in length of a transport interval according to sheet size and a time for the sheet eject mechanism to move back from the sorting position to the initial position (independent claim 1). Moreover, there is no teaching or suggestion of a control device that regulates delay time based on detected sizes of sheets being processed (independent claim 10).

Therefore, even if Shiraishi was somehow combined with Horiguchi, the proposed combination would not teach or suggest determining the delay time for a sheet eject mechanism to start to return to an initial position from a sorting position in the manner recited in independent claims 1 and 10.

II. There is no teaching or suggestion in Horiguchi in view of Shiraishi of an image forming apparatus in which a sheet eject mechanism is movable from an initial position to a sorting position with a sheet held therein, and after ejecting the sheet, the sheet eject mechanism moves back to the initial position while not holding the sheet.

In the Final Office Action, Shiraishi was cited for allegedly teaching the control device recited in independent claims 1 and 10 (see Final Office Action at page 2, second paragraph).

Referring to FIGS. 5A to 5F of Shiraishi, a copy sheet P having been transported along a fixed paper path is fed to, and pinched by, discharge rollers 21 placed in the "initial position" (see column 5, lines 59-61; FIG. 5A). Then, a moving element 22 is moved from the initial position to the "opposite position," where the sheet P is discharged into a discharge tray 3 (see column 5, line 62 to column 6, line 5; FIGS. 5B and 5C). Next, a subsequent copy sheet having been transported along the fixed paper path is fed to, and pinched by, the discharge rollers 21 placed at the opposite position (see column 6, lines 21-24; FIG. 5D). The moving element 22 is then moved from the opposite position to the initial position, where the subsequent copy sheet is discharged into the discharge tray 3 (see column 6, lines 24-34; FIGS. 5E and 5F).

In Shiraishi, the moving element 22 holds a first sheet therein at the initial position, and moves from the initial position to the opposite position with the first sheet held therein. After ejecting the first sheet at the opposite position, the moving element 22 receives a second sheet, and moves from the opposite position to the initial position with the second sheet held therein.

In other words, the "initial position" and the "opposite position" in Shiraishi are both sorting positions to perform offset stacking. Shiraishi does not teach or suggest an image forming apparatus in which after ejecting a sheet at a sorting position, the sheet eject mechanism returns from the sorting position to an initial position, while not holding any sheet. In Shiraishi, a sheet is always held in the moving element 22 during movement between the "initial position" and the "opposite position," and both positions serve as sorting positions.

III. One of ordinary skill in the art would lack proper motivation to make the proposed combination of Horiguchi in view of Shiraishi, and any such combination would not result in the Appellants' claimed invention.

In the Final Office Action, it was admitted that Horiguchi does not teach or suggest the sheet eject mechanism "which moves between an initial position and a sorting position," and the control device for regulating delay time as claimed (see Final Office Action at page 2, second paragraph).

The Shiraishi reference was cited to remedy the deficiencies of Horiguchi. The Examiner concluded that "it would have been obvious to one of ordinary skill in the art to modify the image forming apparatus of Horiguchi et al. by providing the sheet [eject] mechanism and the control device as taught [by] Shiraishi for determining or regulating the delay time..." (Final Office Action at page 2, last paragraph).

However, it is unclear how the Shiraishi reference could be combined with the Horiguchi reference. It appears that the Examiner is proposing to substitute the "sheet eject mechanism" and "control device" of Shiraishi into the image forming apparatus of Horiguchi. However, Horiguchi already discloses a sheet stacking mechanism whose elimination would destroy the utility of Horiguchi.

Moreover, for at least the reasons discussed above, the Horiguchi and Shiraishi references do not teach or suggest the claimed invention as recited in independent claims 1 and 10.

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Appellants submit that all of the claims under final rejection are in condition for allowance and should be allowed, and that the Final Office Action should be vacated.

Respectfully submitted,

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CLAIMS APPENDIX

Claim 1 (previously presented): An image forming apparatus comprising:

a sheet eject mechanism movable between an initial position and a sorting position in a direction orthogonal to a sheet transport direction in sorting processing, and to eject sheets being sorted by copy or by image-forming job in the sorting processing to a receiving tray; and

a control device for determining a delay time required for the sheet eject mechanism moving from the initial position to the sorting position with a sheet held therein to start to return to the initial position after ejecting the sheet to the receiving tray, based on a difference in length between a transport interval that varies according to sizes of sheets being processed and time that it takes the sheet eject mechanism to move back from the sorting position to the initial position, the sheets being transported sequentially to the sheet eject mechanism at the transport interval.

Claim 2 (original): The image forming apparatus according to claim 1, wherein the control device compares the transport interval with a preset reference transport interval, thereby setting a longer delay time than a reference delay time corresponding to the reference transport interval if the transport interval is longer than the reference transport interval, and a shorter delay time than the reference delay time if the transport interval is shorter than the reference transport interval.

Claim 3 (original): The image forming apparatus according to claim 1, wherein the control device determines whether or not a sheet is of a particular size with its transport interval shorter than the reference transport interval, and if the sheet is of the particular size, sets a shorter delay

time than the reference delay time corresponding to the reference transport interval.

Claim 4 (original): The image forming apparatus according to claim 1, wherein the sheet eject mechanism moves with each copy or image-forming job to sort alternately between the initial position and sorting positions arranged on both sides of the initial position in the direction orthogonal to the sheet transport direction.

Claim 5 (previously presented): The image forming apparatus according to claim 1, wherein the control device is provided for selectively setting either of a first image-forming speed and a second image-forming speed as an image-forming speed in the sorting processing, the first image-forming speed being used when sorting processing is not performed, and the second image-forming speed being less than the first image-forming speed.

Claim 6 (original): The image forming apparatus according to claim 5, wherein the control device, comparing in sheet sorting processing the transport interval at the first image-forming speed with a preset reference transport interval, sets the first image-forming speed as the image-forming speed in the sorting processing when the sheet transport interval is longer than the preset reference transport interval; and sets the second image-forming speed as the image-forming speed when the sheet transport interval is shorter than the reference transport interval.

Claim 7 (original): The image forming apparatus according to claim 5, wherein the control

device determines whether a sheet is of a particular size, the sheet transport interval being shorter than the reference transport interval in the particular size, and sets the second image-forming speed when the sheet is of the particular size.

Claim 8 (original): The image forming apparatus according to claim 5, wherein the control device changes timings at which a sheet is transported to an image forming section.

Claim 9 (original): The image forming apparatus according to claim 5, wherein the sheet eject mechanism moves with each copy of sheets or each image-forming job to sort alternately between the initial position and sorting positions arranged on both sides of the initial position in the direction orthogonal to the sheet transport direction.

Claim 10 (previously presented): An image forming apparatus comprising:
a sheet eject mechanism movable between an initial position and a sorting position in a direction orthogonal to a sheet transport direction in sorting processing, and to eject sheets being sorted by copy or by image-forming job in the sorting processing to a receiving tray; and
a control device for regulating a delay time required for the sheet eject mechanism moving from the initial position to the sorting position with a sheet held therein to start to return to the initial position after ejecting the sheet to the receiving tray, wherein the control device regulates the delay time based on detected sizes of sheets being processed, the sheets being transported sequentially to the sheet eject mechanism.

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EVIDENCE APPENDIX

- Tab A Copy of U.S. Patent 6,113,094 to Horiguchi et al. ("Horiguchi"), as relied on by the Examiner in the Final Office Action of 01/10/2006.
- Tab B Copy of U.S. Patent 6,445,891 to Shiraishi, as relied on by the Examiner in the Final Office Action of 01/10/2006.

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RELATED PROCEEDINGS APPENDIX

None.